CMMI Engineering Improvement Its not a Technical Problem, it's a People Problem!

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Improving Software Economics

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Successful Businesses...

- Run operations as if they were a franchise
  - Every business process is standardized
  - Average employees can easily be successful by following the processes as outlined
  - Well executed processes are scaled and leveraged across the organization
- For software organizations, “franchising” processes can result in a 50% or more increase in productivity

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What is Engineering (Process) Improvement?

- A planned, managed, and controlled effort aimed at improving an organization's product development capability
- Is most effective when coupled with Organizational Transformation best practices

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Return On Investment

- Organizations typically invest 2%-4% of their IT budget on engineering improvement
- Organizations engaged in a engineering improvement effort experience 50%+ gains in productivity and a 25%+ decreases in post-release defects
- Average ROI was 5:1
- Example: An IT department with a $100M budget spending $4M can expect a $20M gain in productivity over 2 years

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The 6 Basic Principles of Engineering Improvement

1. Major changes to the process must start at the top
2. Effective change requires a goal and knowledge of the current process
3. Engineering improvement requires investment
4. Ultimately, everyone must be involved
5. Process changes will not be retained without conscious effort and periodic reinforcement
6. Change is continuous

Source: Humphrey, W.S. *Managing the Software Process.* Addison-Wesley, 1989

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Other Key Concepts

1. To improve the process, someone must work on it
2. Unplanned engineering improvement is wishful thinking
3. Automation of a poorly defined process will produce poorly defined results
4. Improvements should be made in small, tested steps
5. Train, train, train!

Source: Humphrey, W.S. *Managing the Software Process.* Addison-Wesley, 1989

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Organizational Transformation

- Engineering improvement models build on organizational transformation theory to ensure effectiveness.
- Thus, it is imperative to understand organizational transformation theory in order to improve the results of any software process improvement effort.

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Organizational Transformation Models

- Initiating, Diagnosing, Establishing, Acting, Leveraging (IDEAL)
- Unfreeze, move, refreeze
- Envisioning, Encoding, Enacting
- Awareness, Understanding, Definition, Installation, Adoption, Institutionalization
- John Kotter's Model of Organizational Transformation

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John P. Kotter's Transformation Best Practices

1. Establish a sense of urgency
2. Create the guiding coalition
3. Develop a vision and strategy
4. Communicate the change vision
5. Empower employees for broad-based action
6. Generate short-term wins
7. Consolidate gains and produce more change
8. Anchor new approaches in the culture

Source: John P. Kotter, Leading Change, Harvard Business School Press, 1996

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1 – Establishing a Sense of Urgency

- Progression to subsequent organizational transformation phases is difficult, if not impossible, unless most managers honestly believe that the status quo is unacceptable

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2 - Creating the Guiding Coalition

- Successful transformations must be guided by a powerful coalition that can act as a team
- The coalition is needed because no one individual has the information needed to make all major decisions or the time and credibility needed to convince lots of people to implement the decisions

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3 – Developing a Vision and Strategy

- Vision refers to a picture of the future with some implicit or explicit commentary on why people should strive to create that future.
- 3 purposes
  - Clarifies the general direction for change
  - Motivates people to take action
  - Coordinates the efforts of different people
- Must be conveyable in 5 minutes or less

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4 – Communicating the Change Vision

- The real power of a vision is unleashed when most of those involved in an enterprise have a common understanding of its goals and direction
- You cannot overcommunicate the vision!
- A common mistake by the guiding coalition is to assume the organization can quickly come to grips with the vision

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5 – Empowering Employees for Action

- Major organizational transformations rarely happen unless many people assist
- Employees generally won't help if they feel relatively powerless

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6 – Generating Short-Term Wins

- Major changes take time
- People need to see convincing evidence that the effort is paying off
- Focus on short-term wins raises the urgency level and ties the transformation effort to the vision and strategy

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7 – Consolidating Gains/Creating More Change

- If the sense of urgency is lowered, critical momentum can be lost and regression follows
- Irrational and political resistance to change never fully dissipates
- Avoid the temptation to “take a break”
- Leadership must keep a long term focus on the vision and anticipated results

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8 – Anchoring New Approaches in the Culture

- The goal is to permanently change the organization's shared values
- Cultural changes come last, not first
- Cultural norms are many times difficult to change
- Cultural shared values are extremely difficult to change
- Will the transformation effort transcend any particular individuals???

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How Do We Transform Engineering?

- Create an infrastructure that:
  - Leverages organizational transformation principles
  - Allows for senior management prioritization of engineering process enhancements
  - Facilitates organizational buy-in and cooperation
  - Encourages cross-organizational communication
  - Reduces resistance through a reward system based on independently verifiable achievement of management's expectations
  - Allows management visibility into the use of standard engineering processes

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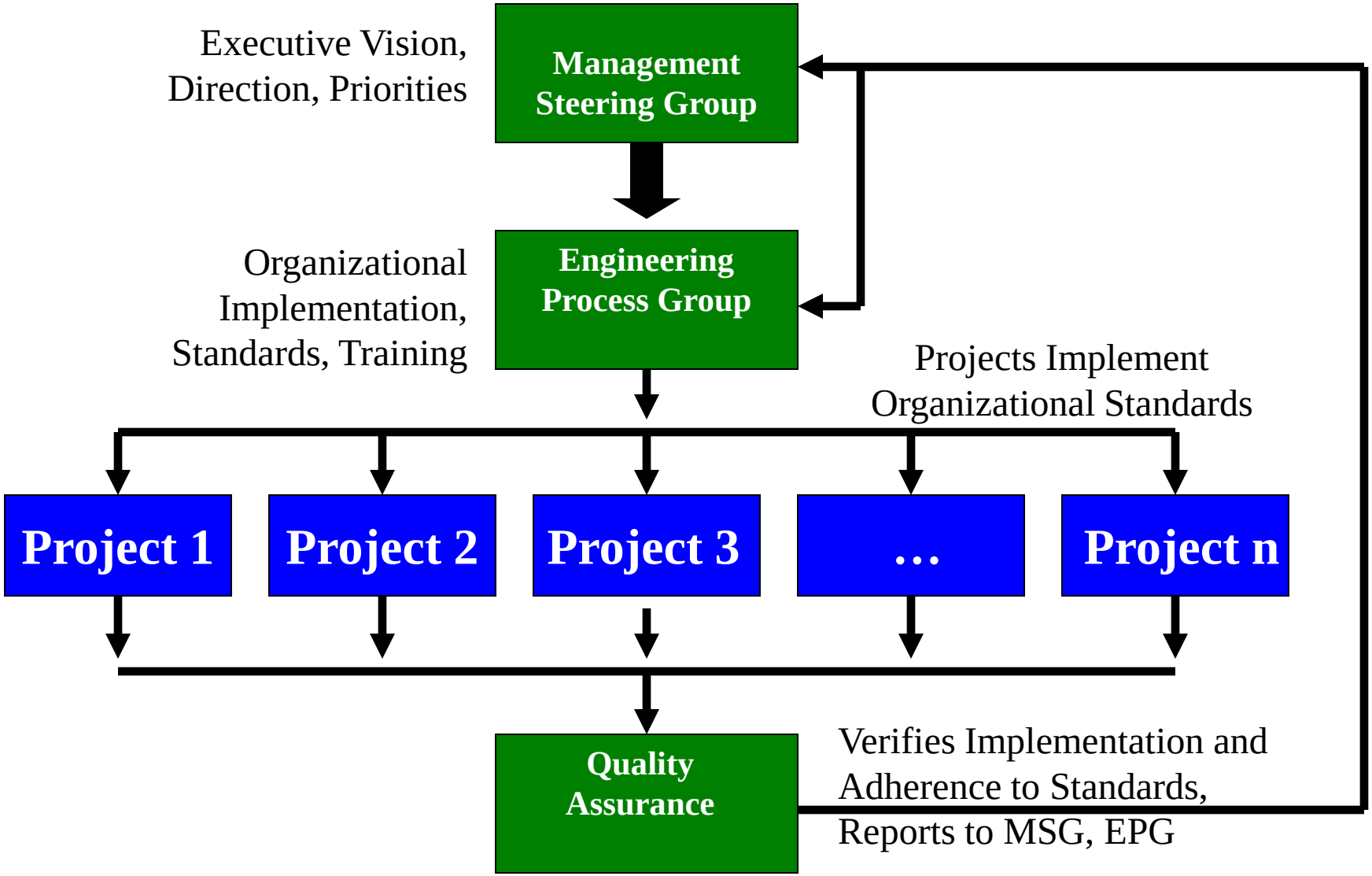
Organizational Transformation Infrastructure



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Roadmap – Setting the Stage

1. Establish Executive Sponsorship with the expectation it is active, not passive
2. Clearly tie the improvement effort to business goals
3. Establish a guiding coalition (MSG/EPG) of movers and shakers from across the organization to drive the strategy, approach, and plan
4. Projectize the effort, assign a cost center, and treat it like a project with clear milestones and reviews
5. Conduct a comprehensive process, project, personnel, and financial appraisals to establish an organizational baseline
6. Tie engineering improvement objectives to each individual's performance review

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Roadmap – Introducing Improvements

7. Establish a measurement capability early, but don't overwhelm projects with data gathering requirements
8. Establish QA early to help guide and mentor, and to report engineering improvement-related progress
9. Ensure project schedules going forward contain all the required elements to meet your CMMI improvement objectives
10. Either adopt processes (that meets your needs!), or have the EPG design ones that are better suited
11. Projects execute CMMI-compliant processes and begin performing better!
12. Continue to monitor key business measures, execute QA, and conduct senior management reviews to drive urgency.

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End Result

- The outcome will be an integrated, organizationally cooperative infrastructure that:
  - is the foundation for a successful organizational transformation
  - facilitates engineering improvement based on business priorities
  - provides an environment that supports project buy-in and adoption of improvements
  - communicates effectively across the organization
  - reports results to senior management

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Thank You!

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